Citation:

Robertson SM, Cullen KW, Baranowski J, Baranowski T, Hu S, de Moor C. Factors related to adiposity among children aged 3 to 7 years. *J Am Diet Assoc* 1999; 99: 938-943.

PubMed ID: 10450308

Study Design:

Longitudinal case-control

Class:

B - Click here for explanation of classification scheme.

Research Design and Implementation Rating:

POSITIVE: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

To compare diet and physical activity between a group of children aged four to seven years who had increased their sum of seven skinfolds by 1.5 standard deviations or more since the previous year and those who had not.

Inclusion Criteria:

Three-year-old or four-year-old children who were enrolled in a four-year longitudinal investigation of the development of cardiovascular disease risk factors and related behaviors at the Texas site of the SCAN study.

Exclusion Criteria:

Mental retardation or other developmental disabilities, history of a chronic illness affecting diet or exercise habits in an immediate family member, no English-speaking parent and no parent residing in the household.

Description of Study Protocol:

Children and their parents living at home were invited to an annual clinic for four consecutive summers. Anthropometric measures were obtained during the annual clinics. Between annual clinics, each child was followed up by paid observers who met the child at 7:00 AM, or when the child usually woke, and continued until dinner was finished, or 7:00 PM. Each child was observed at approximately three-month intervals. Observations were conducted between annual clinics, with an attempt to space observations through the seasons of the year. Observational measures included level of physical activity, food intake and other related variables not included in these analyses.

Data Collection Summary:

Dependent Variables

- Adiposity take-off (defined as children whose adiposity increased 1.5 standard deviations or more above the mean from the previous year)
- Seven skinfold sites (triceps, biceps, subscapula, abdominal, supraliac, thigh and calf). Three measurements were taken at each of the seven sites using standard procedures.

Independent Variables

- *Dietary intake:* Energy, total fat, carbohydrate and protein intake and percentage of energy from the macronutrients (average of up to four days of observation per year)
- *Children's physical activity:* Observed for four days each year.

Control Variables

Subjects matched on age, race or ethnicity, and gender.

Statistical Analysis

Mixed-model ANOVA.

Description of Actual Data Sample:

- *Initial N:* 105 children with complete data
- *Final N:* 15 preschool children who were identified from a larger study with "adiposity take-off" (children whose adiposity increased 1.5 standard deviations or more above the mean from the previous year) and 33 matched control subjects. Matched on age, ethnicity and gender for the same year of data collection and three were randomly selected as control subjects per case.
- *Race/Ethnicity:* Mixed subsample of 20 white, 12 Mexican-American and 16 African-American children.
- *Location:* Texas.

Summary of Results:

- The children with adiposity take-off consumed significantly more fat grams (P=0.02) and suggestively higher percentage of energy from fat (P=0.06), total energy (P=0.08) and percentage from protein (P=0.10)
- No differences were detected for percentage of energy from carbohydrate, physical activity or height
- To assess the role of diet and physical activity in the year before take-off
- Significant differences were found for total energy (P=0.01) and total fat grams (P=0.02) but not for fat as percentage of energy, physical activity or height for the year before take-off.

Author Conclusion:

Programs to prevent obesity might have success by targeting dietary fat consumption among children as young as four years old, but further research is needed.

Reviewer Comments:

Strengths

- *Non-self-report nature of the behavioral variables*
- *Assessment of multiple skinfold sites to enhance reliability of estimation of body fat.*

Limitations

- *Relatively small sample*
- *Relatively high intra-individual variability in assessment: There was limited ability of these measures to detect such a relationship*
- *It is not clear whether the investigators were blinded in the study for the record of observations.*
- *Subjects are not randomized*
- *Further randomized controlled trial studies are required to observe the same outcome.*

Research Design and Implementation Criteria Checklist: Primary Research

Relevance Questions		
1.	Would implementing the studied intervention or procedure (if found successful) result in improved outcomes for the patients/clients/population group? (Not Applicable for some epidemiological studies)	N/A
2.	Did the authors study an outcome (dependent variable) or topic that the patients/clients/population group would care about?	Yes
3.	Is the focus of the intervention or procedure (independent variable) or topic of study a common issue of concern to nutrition or dietetics practice?	Yes
4.	Is the intervention or procedure feasible? (NA for some epidemiological studies)	N/A

Validity Questions		
1.	**Was the research question clearly stated?**	Yes
1.1.	Was (were) the specific intervention(s) or procedure(s) [independent variable(s)] identified?	Yes
1.2.	Was (were) the outcome(s) [dependent variable(s)] clearly indicated?	Yes
1.3.	Were the target population and setting specified?	Yes
2.	**Was the selection of study subjects/patients free from bias?**	Yes
2.1.	Were inclusion/exclusion criteria specified (e.g., risk, point in disease progression, diagnostic or prognosis criteria), and with sufficient detail and without omitting criteria critical to the study?	Yes

2.2.	Were criteria applied equally to all study groups?	Yes
2.3.	Were health, demographics, and other characteristics of subjects described?	Yes
2.4.	Were the subjects/patients a representative sample of the relevant population?	???
3.	**Were study groups comparable?**	Yes
3.1.	Was the method of assigning subjects/patients to groups described and unbiased? (Method of randomization identified if RCT)	Yes
3.2.	Were distribution of disease status, prognostic factors, and other factors (e.g., demographics) similar across study groups at baseline?	N/A
3.3.	Were concurrent controls used? (Concurrent preferred over historical controls.)	Yes
3.4.	If cohort study or cross-sectional study, were groups comparable on important confounding factors and/or were preexisting differences accounted for by using appropriate adjustments in statistical analysis?	Yes
3.5.	If case control or cross-sectional study, were potential confounding factors comparable for cases and controls? (If case series or trial with subjects serving as own control, this criterion is not applicable. Criterion may not be applicable in some cross-sectional studies.)	Yes
3.6.	If diagnostic test, was there an independent blind comparison with an appropriate reference standard (e.g., "gold standard")?	N/A
4.	**Was method of handling withdrawals described?**	Yes
4.1.	Were follow-up methods described and the same for all groups?	Yes
4.2.	Was the number, characteristics of withdrawals (i.e., dropouts, lost to follow up, attrition rate) and/or response rate (cross-sectional studies) described for each group? (Follow up goal for a strong study is 80%.)	Yes
4.3.	Were all enrolled subjects/patients (in the original sample) accounted for?	Yes
4.4.	Were reasons for withdrawals similar across groups?	???
4.5.	If diagnostic test, was decision to perform reference test not dependent on results of test under study?	N/A
5.	**Was blinding used to prevent introduction of bias?**	Yes
5.1.	In intervention study, were subjects, clinicians/practitioners, and investigators blinded to treatment group, as appropriate?	N/A

5.2.	Were data collectors blinded for outcomes assessment? (If outcome is measured using an objective test, such as a lab value, this criterion is assumed to be met.)	N/A
5.3.	In cohort study or cross-sectional study, were measurements of outcomes and risk factors blinded?	Yes
5.4.	In case control study, was case definition explicit and case ascertainment not influenced by exposure status?	Yes
5.5.	In diagnostic study, were test results blinded to patient history and other test results?	N/A
6.	**Were intervention/therapeutic regimens/exposure factor or procedure and any comparison(s) described in detail? Were interveningfactors described?**	Yes
6.1.	In RCT or other intervention trial, were protocols described for all regimens studied?	N/A
6.2.	In observational study, were interventions, study settings, and clinicians/provider described?	Yes
6.3.	Was the intensity and duration of the intervention or exposure factor sufficient to produce a meaningful effect?	Yes
6.4.	Was the amount of exposure and, if relevant, subject/patient compliance measured?	Yes
6.5.	Were co-interventions (e.g., ancillary treatments, other therapies) described?	No
6.6.	Were extra or unplanned treatments described?	N/A
6.7.	Was the information for 6.4, 6.5, and 6.6 assessed the same way for all groups?	Yes
6.8.	In diagnostic study, were details of test administration and replication sufficient?	N/A
7.	**Were outcomes clearly defined and the measurements valid and reliable?**	Yes
7.1.	Were primary and secondary endpoints described and relevant to the question?	Yes
7.2.	Were nutrition measures appropriate to question and outcomes of concern?	Yes
7.3.	Was the period of follow-up long enough for important outcome(s) to occur?	Yes
7.4.	Were the observations and measurements based on standard, valid, and reliable data collection instruments/tests/procedures?	Yes
7.5.	Was the measurement of effect at an appropriate level of precision?	Yes
7.6.	Were other factors accounted for (measured) that could affect outcomes?	Yes
7.7.	Were the measurements conducted consistently across groups?	Yes

8.	**Was the statistical analysis appropriate for the study design and type of outcome indicators?**		Yes
	8.1.	Were statistical analyses adequately described and the results reported appropriately?	Yes
	8.2.	Were correct statistical tests used and assumptions of test not violated?	No
	8.3.	Were statistics reported with levels of significance and/or confidence intervals?	Yes
	8.4.	Was "intent to treat" analysis of outcomes done (and as appropriate, was there an analysis of outcomes for those maximally exposed or a dose-response analysis)?	N/A
	8.5.	Were adequate adjustments made for effects of confounding factors that might have affected the outcomes (e.g., multivariate analyses)?	No
	8.6.	Was clinical significance as well as statistical significance reported?	Yes
	8.7.	If negative findings, was a power calculation reported to address type 2 error?	???
9.	**Are conclusions supported by results with biases and limitations taken into consideration?**		Yes
	9.1.	Is there a discussion of findings?	Yes
	9.2.	Are biases and study limitations identified and discussed?	No
10.	**Is bias due to study's funding or sponsorship unlikely?**		Yes
	10.1.	Were sources of funding and investigators' affiliations described?	Yes
	10.2.	Was the study free from apparent conflict of interest?	Yes